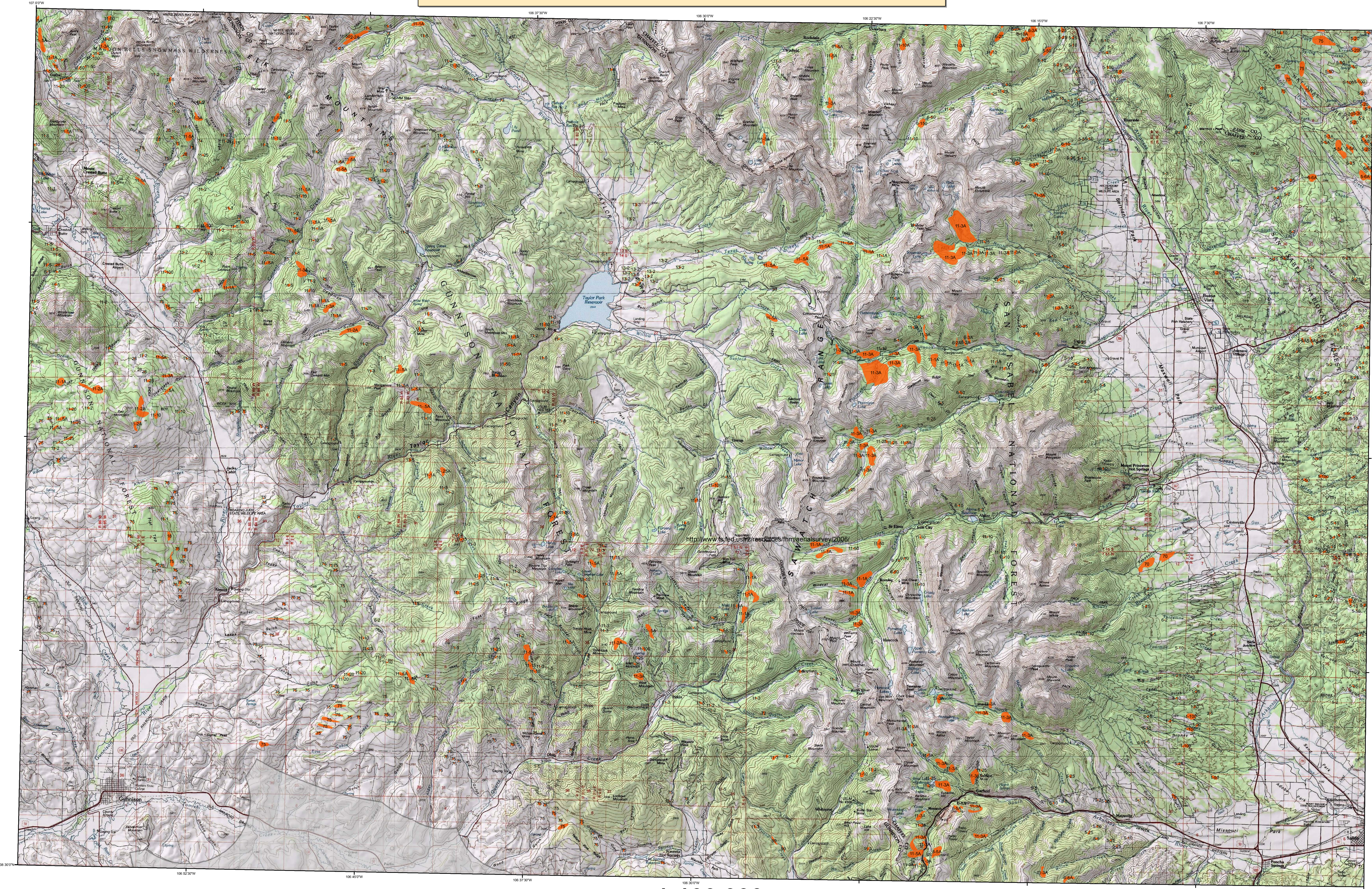# 2006 Aerial Insect and Disease Survey
Gunnison, Colorado
USGS 100K TOPO!: 38106-E1

1:100,000
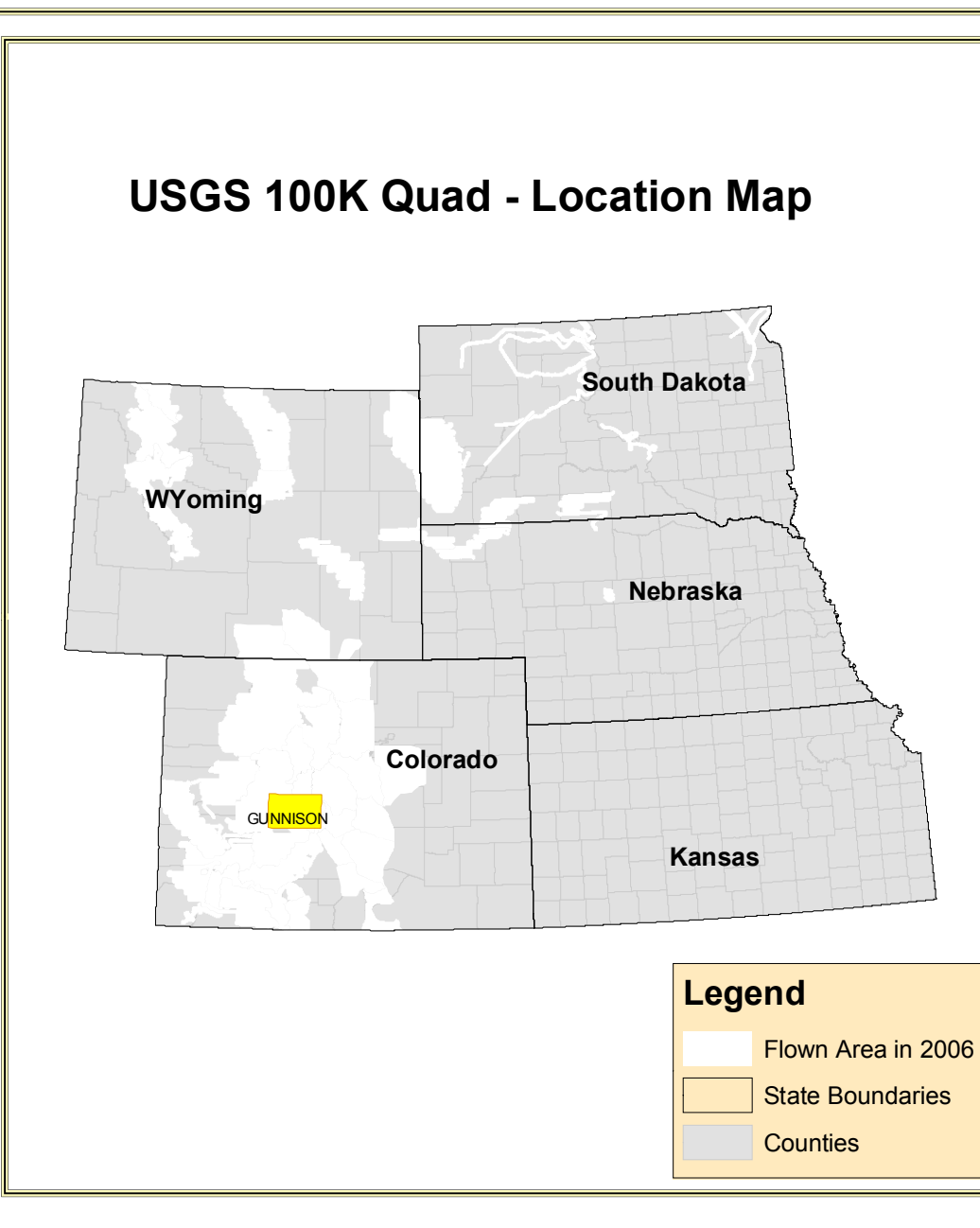
Legend

| | Causal Agent(s) | | Not Flown in 2006 |

Use of the Number System

Example: 5-25 = The first number before the dash is the causal agent code. The number after the dash is the number of dead "fader" trees in the polygon or point. When recent dead trees are not counted, an intensity code of L-light, M-moderate, and H-high may be used after the causal agent code. Periodically, trees per acre estimates are used after the causal agent code instead of number of dead "fader" trees or an intensity code. For example: 5-12A = The first number before the dash is the causal agent code. The number after the dash is an estimation of the number of dead "fader" trees per acre. In this case it would be an estimation that, on the average, one tree per every two acres would be a dead "fader" tree. In another example: 5-3A = that on the average, an estimated three trees per acre are dead "fader" trees. A / is used as a separator when a point/polygon has more than one causal agent.

Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host
1	Douglas-fir beetle	Douglas-fir	49	Atropella	Lodgepole Pine	105	fox squirrel flagging	Cottonwood,Poplar
2	Engelmann Spruce Beetle	Engelmann Spruce	50	White pine blister rust	5-Needle Pine	107	fall webworm	Cottonwood,Poplar
3	Mountain pine beetle	Ponderosa Pine	52	Dwarf mistletoe	Conifers	108	root salt	Softwoods
4	Mountain pine beetle	Lodgepole Pine	53	Elytroderma	Ponderosa Pine	109	pinewood nematode	Scotch Pine
5	Mountain pine beetle	5-Needle Pine	54	Includes #65, 66 & 69	All Tree Species	110	oak wilt	Oak
6	Western pine beetle	Ponderosa Pine	55	Air pollutants	All Tree Species	111	foliage disease	All Tree Species
7	Fir Engraver	White Fir	56	Chemical damage	All Tree Species	112	spruce ips	White Spruce
9	Douglas-fir engraver beetle	Douglas-fir	59	Lophodermium pinastri	Softwoods	113	twolined chestnut borer	Oak
10	Western balsam bark beetle	Subalpine Fir	61	Rhabdocline pseudotsugae	Douglas-fir	114	anthracnose like foliar disease	All Tree Species
12	Unknown bark beetle	Softwoods	63	Lophodermella arcuata	Softwoods	115	Dieback	All Tree Species
15	Pine engraver	Lodgepole Pine	64	Lophodermella concolor	Softwoods	116	Mortality (spruce)	All Tree Species
16	Pine engraver	Lodgepole Pine	65	Lophodermella cerebrum	Softwoods	117	Mortality (fir)	All Tree Species
17	Ponderosa pine needle miner	Ponderosa Pine	67	Didtistroma pini	Softwoods	118	Herbicide	All Tree Species
18	Lodgepole pine needle miner	Lodgepole Pine	69	Needle cast (mycodematadeae)	Softwoods	119	Flagging	All Tree Species
17	Jack pine budworm	Jack Pine	74	Root Rot	All Tree Species	120	aspen tortrix	Quaking Aspen
18	Spruce budworm, light defol.	Douglas-fir	73	Unidentified disease	Softwoods	121	Marssonina Blight	Quaking Aspen
19	Spruce budworm, medium defol.	Douglas-fir	72	Winter damage medium	All Tree Species	220	Discoloration	Oak
21	Spruce budworm, heavy defol.	Douglas-fir	70	Winter damage medium	All Tree Species	201	Dieback (cottonwood)	Softwoods
23	Pine Butterfly	Ponderosa Pine	78	Diplodia	Softwoods	203	Dieback (oak)	Oak
27	Pine looper	Ponderosa Pine	79	Pinyon black stain	Common Pinyon	210	Mortality (old cottonwood)	Cottonwood,Poplar
29	Pine tortrix	Ponderosa Pine	60	Fire	All Tree Species	211	Mortality (western cedar)	Eastern Red Cedar
31	Tent caterpillars	Hardwoods	70	Porcupine	Softwoods	212	Mortality (hardwood)	Hardwoods
32	Leaf beetles	Hardwoods	71	Windthrow	All Tree Species	213	Mortality (oak)	Oak
33	Oak leaf roller	Hardwoods	73	High water damage	All Tree Species	214	Mortality (spruce)	Spruce
34	Pine needle-sheath miner	Ponderosa Pine	74	Avalanche	Softwoods	218	Discoloration (conifer)	Spruce
35	Pine sawflies	Ponderosa Pine	75	Aspen decline-multiple agent(s)	Quaking Aspen	221	Discoloration (conifer)	Softwoods
36	Pine tussock moth	Ponderosa Pine	76	Pinyon pine mortality	Juniper	223	Discoloration (hardwood)	Hardwoods
37	Cankerworms	Hardwoods	77	Juniper mortality-unknown agent(s)	Juniper	224	Discoloration (eastern fir)	Eastern Red Cedar
38	Variable oak leaf caterpillar	All Tree Species	78	Gambel oak decline-unknown agent(s)	Gambel Oak	230	Discoloration (hardwood)	Hardwoods
41	Unidentified defoliator	Softwoods	79	Limber pine decline-(multiple agent/s)	Limber Pine	235	Discoloration (oak)	Oak
43	Heterobasidion annosum (Fomes annosus)	Softwoods	80	Hail damage	All Tree Species	236	Discoloration (oak)	Oak
44	Armillaria ostoyae (Armillaria mellea)	Softwoods	90	Unknown polygon	Unknown	237	Discoloration (spruce)	Spruce
45	Polyporus schweinitzii	Softwoods	100	old pinyon mortality	Common Pinyon	239	Herbicide (eastern cedar)	Eastern Red Cedar
46	Phomopsis	Softwoods	101	road salt Ips	Lodgepole Pine	247	Flagging (hardwood)	Hardwoods
47	Western gall rust	Lodgepole Pine	103	black stain	Softwoods	245	Flagging (spruce)	Spruce
48	Comandra rust	Unknown	104	dibicha bright	Ponderosa Pine	270	Unidentified defoliator (cottonwood)	Narrowleaf Cottonwood
48	Stalasthrene rust	Lodgepole Pine	105	drought killed narrow leaf cottonwood	Narrowleaf Cottonwood	300	Mortality (pine)	Pine

USGS 100K Quad - Location Map

Legend
Flown Area in 2006
State Boundaries
Counties

How Aerial Surveys Are Conducted

Data represented on this map are based on aerial observations manually recorded onto a map. This procedure is considered both an art form and a form of scientific data collection, and is highly subjective. An observer only has a few seconds to recognize the color difference between healthy and damaged trees of different species; diagnose causal agents correctly; estimate intensity; delineate the extent of damage; and precisely record this information on a georeferenced map. Air turbulence, cloud shadows, distance from aircraft, haze, smoke, and observer experience can all affect the quality of the survey. These data summaries provide an estimate of conditions on the ground and may differ from estimates derived by other methods.

Aerial surveys provide information on the current status for many causal agents, and are important when examining insect activity trends by comparing historical and current survey data over large areas.

Overview surveys are a snap shot in time and therefore may not be timed to accurately capture the true extent or severity of a particular disturbance activity. Aerial surveys can be thought of as the first stage in a multi-stage sampling design. Other remote sensing approaches, including aerial photography, electro-optical sensors, and specially designed aerial surveys with modified flight patterns, can be used to more accurately delineate the extent and severity of a particular disturbance agent. The preceding methods are often more costly than overview surveys, and are generally reserved to address situations of sufficient environmental, economic, or political importance.

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*****DISCLAIMER*****

Due to the nature of aerial surveys, the data on this map will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented on this map because these agents are not detectable from aerial surveys. The data presented on this map should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and causal agent. Shaded areas show locations where tree mortality or defoliation were apparent from the air. Intensity of damage is variable and not all trees in shaded areas are dead or defoliated.

The insect and disease data represented on this map are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using this map for purposes other than those for which it was intended may yield inaccurate or misleading results.

A data dictionary and digital copies of this map and the insect and disease data are available at: http://www.fs.fed.us/r2/resources/fhm/aerialsurvey/

Area surveyed by Erik Johnson and Pat Ahern
07/24 - 07/31 2006 and 08/30 - 09/06 2006
Map Created: 01/04/2007
Projection: UTM NAD83 Zone 13
Author: J. Ross, USDA Forest Service

http://www.fs.fed.us/r2/resources/fhm/aerialsurvey/2006/